Vital Signs Monitoring:
Roadmap for the Southeast Coast Network

Four Phases of Developing a Vital Signs Monitoring Program

Development of the Southeast Coast Network (SECN) Vital Signs monitoring program is a four phase process including Baseline Inventories, Vital Sign selection, Protocol Development, and Monitoring Plan Implementation (Figure 1). The Southeast Coast Network is currently conducting its baseline inventories, and if everything goes as planned, all baseline inventories scheduled in the Network Study Plan will be underway by the end of FY 2003. We are now beginning the second phase of the program: Selecting Vital Signs.

Because we're starting the second phase of the program earlier than intended, I wanted to give a little background on where we're headed and why. The discussion below is a brief primer on what Vital Signs are, and how we're going to choose them.

Selecting Vital Signs – A Closer Look

What is a "Vital Sign"?

A Vital Sign is the NPS analogy for an environmental indicator. We have borrowed this term from the medical field because we are searching for indicators of environmental "health." An indicator, or Vital Sign, is anything measurable that predictably responds to environmental changes. This has two important components:

1. Indicators are measurable. Measurements can be either quantitative or qualitative, but they have to be concrete enough to either count, classify, or rank. For example, "Altered Fish Communities" is not measurable, but the percentage of exotic species within that community is.
2. Indicators are predictable. Indicators respond predictably to changes in the structure or function of ecosystems. The types of responses can vary widely – from correlations to threshold responses, but for an indicator to be of use, the response has to be the same every time.

There are many reasons to use indicators in monitoring programs, including cost, speed of data collection and analysis, and ease of communicating results:

1. Cost. It's often cheaper to measure the indicator than the actual thing you're interested in. For example, if you're interested in water quality in a stream where a sensitive species lives, it's generally cheaper to count the number of those fish present than it is to collect water quality samples and send them off to a lab for expensive analysis.
2. Speed. One of the main benefits of using indicators is that you have information that is immediately useful – you don't have to wait for a lab analysis to come back.
3. Communicating Results. People tend to identify with indicators better. People fish, hunt, walk outdoors, have pets, and watch nature shows on television. They have real-world experience with these things. Most people don't identify with environmental standards or how they were derived.

Our challenge is to choose the few of the literally thousands of possible indicators so that the ones we end up with (Vital Signs) give everyone the most useful information possible.

How will we make sense of all these "Vital Signs"?

With thousands of potential Vital Signs to choose from, we have to find some way to simplify things. To do this, we will be developing a "conceptual model" of the resources we have to manage and how Vital Signs monitoring can help us do that job. To do this, most of the other networks are following an approach developed by the Environmental Protection Agency that begins by first identifying key resources for each of the parks. After key resources are identified, the networks determine (a) agents of change, (b) ecosystem stressors, and (c) responses to those stressors (Figure 2) (Kurtz et al. 2001). The twelve networks that have gone through this process have come up with very different conceptual models, but their goals have been essentially the same:

1. Clearly identify links between management issues and potential Vital Signs.
2. Provide framework for identifying Natural Resource issues and monitoring needs.
3. Identify common themes among diverse resources, managers, and other stakeholders.
4. Make sense out of chaos.

I have attached an example of a conceptual model for stream systems on Eglin Air Force Base (Figure 3).

Where do we start?

Before we will be able to design a conceptual model (or models) for the Southeast Coast Network, we're going to have to spend some time gathering some necessary information. Four sources of information will be drawn upon during the Vital Signs scoping and planning process: planning documents, expert opinion, ongoing and completed research, and common sense (Figure 4). The Network staff will identify existing NR Management issues by reviewing the existing planning documents listed in Figure 4 and conducting interviews with park staff and other experts as needed. All interviews will be conducted to identify the various "agents of change," "stressors," and "ecosystem responses" that the SECN parks face when managing their natural resources.

Vital Signs scoping sessions will begin this coming fall (FY '03-'04), and will be the venue to bring together internal and external experts to (a) review lists of management issues that our parks face, (b) clearly define the management questions that Vital Signs Monitoring can address, (c) discuss draft conceptual models based on initial findings, and (d) identify potential Vital Signs.

How are we going to select our "final" Vital Signs?

This is a very good question, and the short answer is we're not exactly sure yet. It is not likely that we will be able to measure every Vital Sign that we would want to, so one of our challenges will be to pare the list down to a core set of Vital Signs that provide the greatest benefit to managers. Currently the National I&M coordinator is working with the Cumberland Piedmont and Appalachian Highlands Networks (also in the Southeast Region) to develop a protocol for prioritizing and selecting final Vital Signs. The methods by which the final Vital Signs will be chosen will be based on such things as management significance, ecological significance, cost, reliability, feasibility, and logistics to name a few.

References

Kurtz, J. C., L. E. Jackson, and W. S. Fisher. 2001. Strategies for evaluating indicators based on guidelines from the Environmental Protection Agency's Office of Research and Development. Ecological Indicators 1:49-60.

Figures

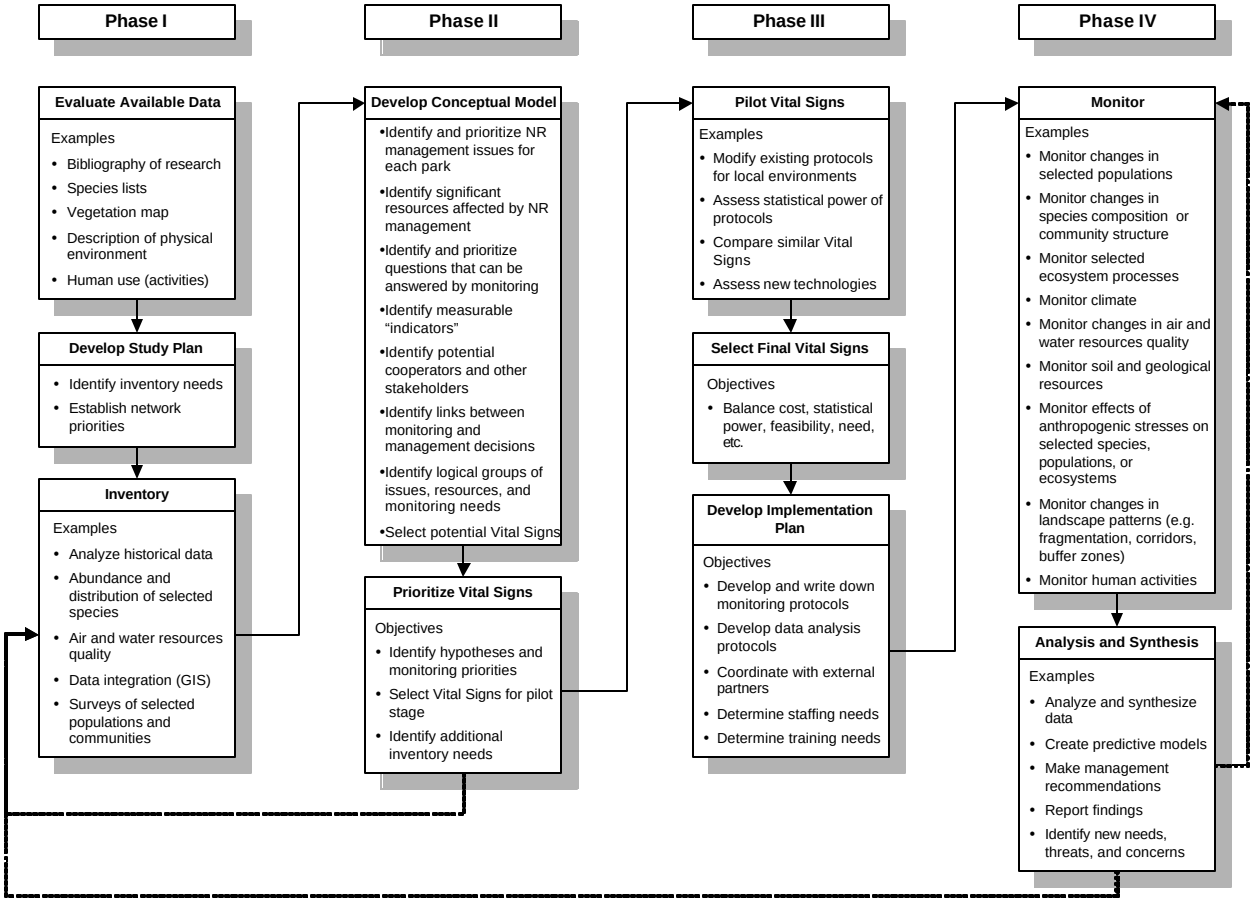

Figure 1. Conceptual overview of the I&M planning process for the Southeast Coastal Network.

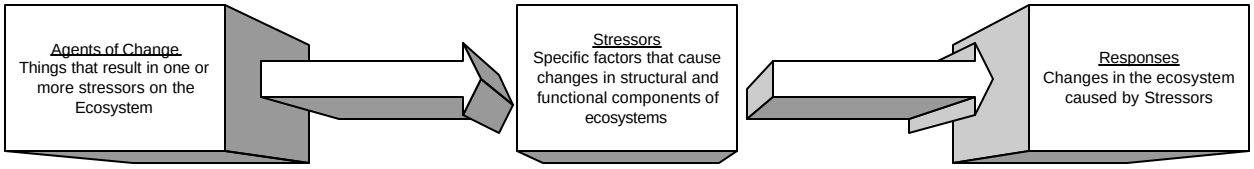

Figure 2. Framework for Vital Signs conceptual modeling.

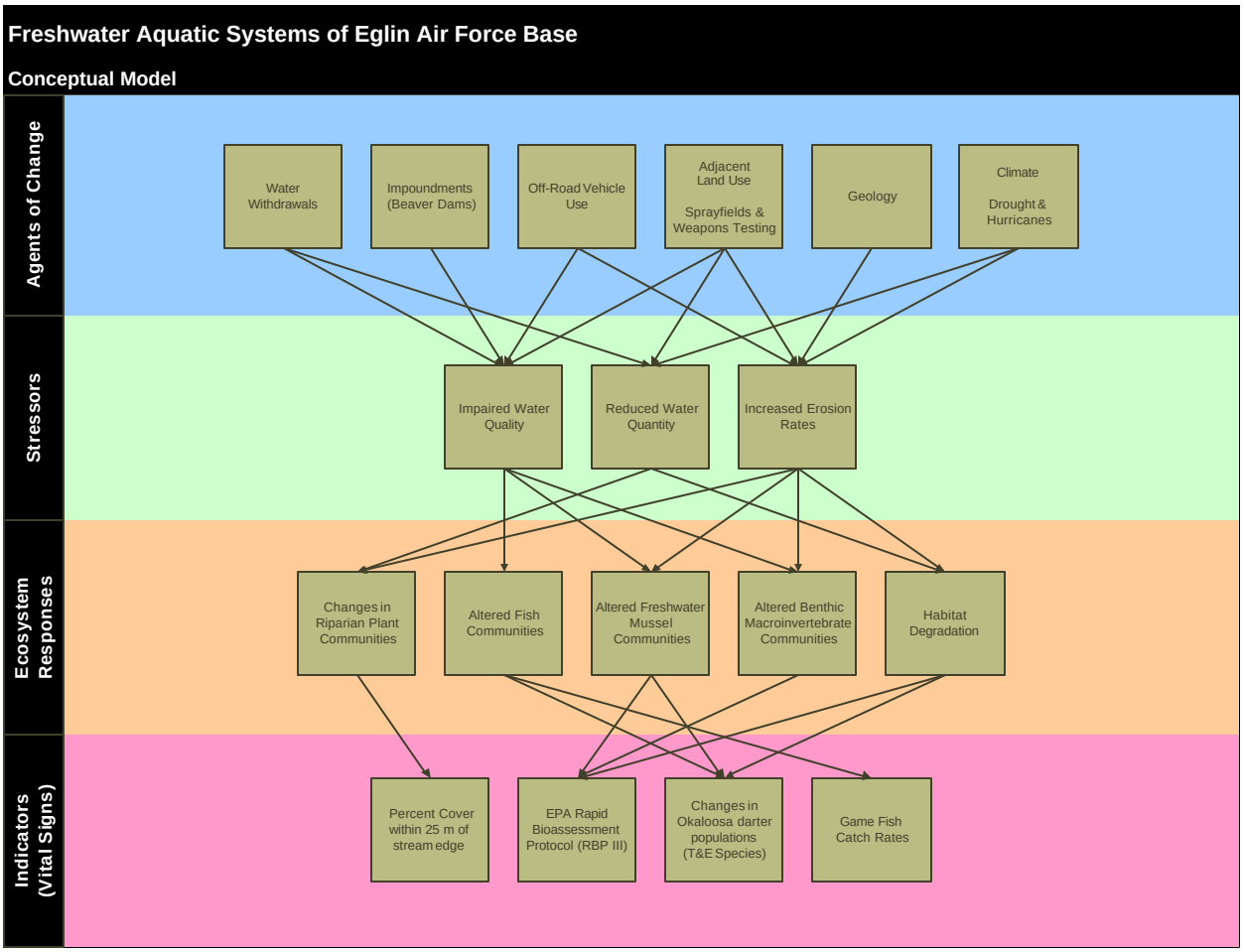

Figure 3. Conceptual model of freshwater aquatic systems of Eglin Air Force Base, Niceville, FL

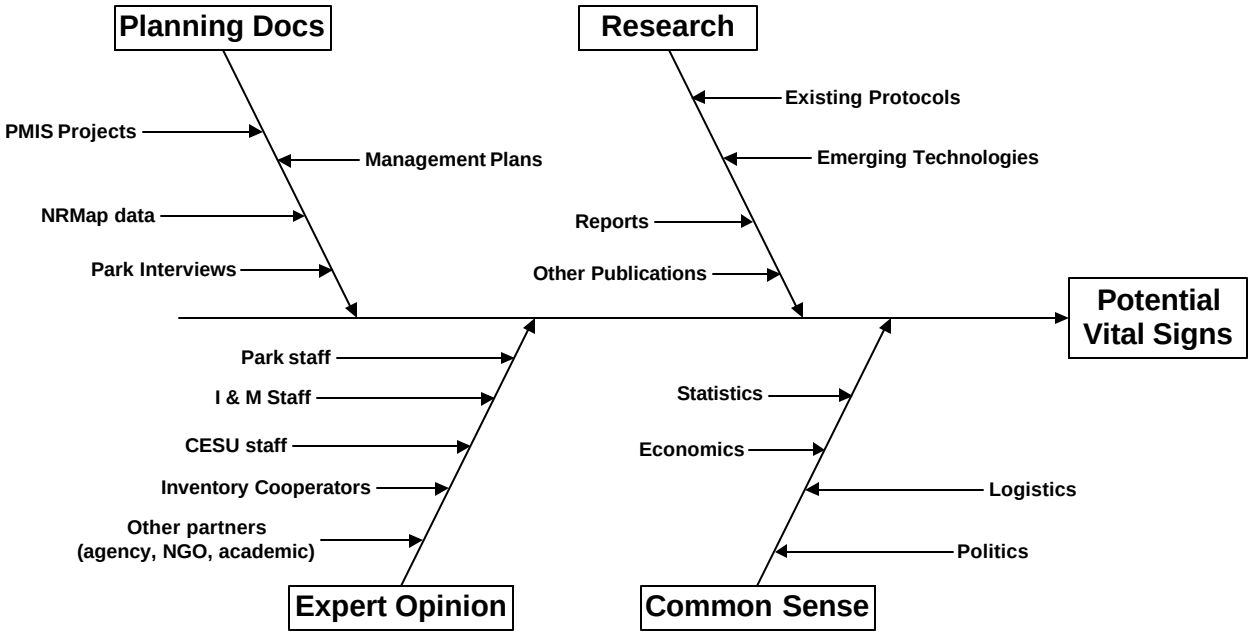

Figure 4. Vital Signs scoping and selection process